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PROVISIONAL SPECIFICATION.

Improvements in Machinery for Cutting Wood into Shavings.

I, LAMBERT WEITZ, of 22 to 24 Billhörnner-Canalstrasse, Hamburg, in the Empire of Germany, Doctor of Philosophy do hereby declare the nature of this invention to be as follows:—

My invention relates to improvements in machinery for cutting blocks of wood into shavings for tanning, dyeing and other purposes.

When Quebra and other woods are worked for the purpose of making tan, and also when valuable woods are worked for dyeing purposes, it is desirable that the product obtained should be as fine and smooth as possible and the formation of splinters and waste or dust be as far as practicable avoided.

For this purpose I set the knives of the machine at such an angle that they cut instead of scrape the block of wood as has heretofore been the case.

The knives may be arranged upon a drum of hyperboloid shape in a slightly inclined position or upon a disc in which case they are placed either radially or tangential to a circle described around the axis of the disc.

In the former case I provide a single frame or holder for the block of wood to be cut the said frame or holder being inclined to the axis of the cutter-drum, and in the latter case I employ two of such inclined frames or holders one on each side of the disc shaft so that the knives operate on one block in descending and on the other in ascending, the frame or holder of the latter block having a cover which prevents the block from rising under the action of the knives.

A serrated plate or piston actuated from the driving shaft through the medium of a rack and pinion and worm and other gearing is employed to automatically feed or press the block forward in its holder against the knives.

Dated the 23rd day of October 1890.

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4, South Street, Finsbury, London, Agents for the Applicant.

COMPLETE SPECIFICATION.

Improvements in Machinery for Cutting Wood into Shavings.

I, LAMBERT WEITZ, of 22 to 24 Billhörnner-Canalstrasse Hamburg, in the Empire of Germany, Doctor of Philosophy do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained, in and by the following statement:—

My invention relates to improvements in machinery for cutting blocks of wood into shavings for tanning, dyeing and other purposes.

When Quebracho and other woods are worked for the purpose of making tan and also when valuable woods are worked for dyeing purposes, it is desirable that the product obtained should be as fine and smooth as possible and the formation of splinters and waste or dust be as far as practicable avoided.

Hitherto it has been customary in order to fulfil these conditions to impart a special position to the block which is placed flat before the knife head, that is to say, with the grain parallel to the drum shaft. This arrangement however is subject to the inconvenience that the block very frequently turns round or jumps out of the holder which not only causes the value of the product to be seriously diminished owing to the tearing off of splinters and formation of waste which destroy its equality but also renders the management of the machine extremely dangerous. The throwing out of gear of the machinery which is

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frequently necessary in order to replace the blocks also very seriously diminishes the turn out.

A very fine class of raspings or shavings may be obtained with machines having a drum-shaped knife head by setting the knife which is itself straight in an inclined position so as to cause it to scrape and not to cut which however experience has shewn ought only to be continued as long as the knife remains sharp. When very hard woods are being worked the cutting edge of the scraping tool wears off very quickly the consequence being that a product is obtained very much mixed with splinters and waste (or chips) which as the edge continues to wear down becomes worse and worse. The consequence is that it is necessary to replace the knives at very frequent intervals the result of which is that owing to the frequent sharpening to which they have to be subjected the knives wear down very quickly and the turn out of the machine becomes very seriously diminished owing to the amount of time which is expended in setting the knives or cutters in operation which must be performed with great exactitude.

It is the object of the present invention to obviate these disadvantages by imparting to the knives or cutters a cutting angle, that is to say, to so set them that they cut instead of scrape. Experiments have shewn that when the knife is employed to cut shavings having a required degree of fineness and softness, they can only be obtained when the knives encounter the grain of the blocks at a certain exact angle which has to be specially ascertained in each case. Attempts have been made to give the knives the required angle to the grain by arranging the block in such a position that its grain is parallel to the drum shaft the knife being at the same time inclined to the drum and passing over it at an angle of, sometimes as much as 45°. In this case however another evil arises for the knives are bent spirally and must be made crooked. The difficulties involved in setting and sharpening the cutters or knives are consequently so great as to render this method of working so expensive as to preclude its application on a large scale.

The desired method of cutting is attained in the present invention by arranging the knives which are set to cut so as to pass straight over the cylindrical drum the block being inclined by so arranging the frame in which it is fixed as to present the grain at the proper angle to the direction of the knives; or by causing the knives to pass over the drum at such an angle that neither the manufacture of the knife head nor the knives themselves or the fixing and keeping them in proper condition shall present any special difficulty and the grain of the blocks can thus be brought into the desired angle relatively to the knives by imparting a much smaller inclination to the block holder or frame than was done in the former case.

In spite of the fact that the former arrangement in which the block frame or holder is very much inclined does not suffer from any special objections, the latter arrangement is in general to be preferred since knives which are somewhat inclined work better and easier under similar conditions than knives which are perfectly straight. In order to give the knives a straight cutting edge when inclined to the axis of the drum it is of hyperboloid shape and on its surface straight lines may be drawn in a given direction, as is well known. It is in this direction that the knives are inserted. In consequence of the straight cutting edge which the knives in this case have, the manufacture and sharpening of them does not present any special difficulty such as would be the case if the drum had the form of an exact cylinder for in that case the inclined knives would have to receive a spiral shaped cutting edge.

The accompanying drawings shew an example of a machine with inclined holder or frame and slightly inclined knives or cutters.

Figure 1 is a side view,

Figure 2 a plan and

Figure 3 is an end view partly in section.

a is the shaft which turns in suitable bearings and carries the drum b in which the knives c which are slightly inclined are so arranged as to work "cutting," the

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holder or frame has an inclined against the kn pressed forward 5 attached to the to the common worm & causing on the drum-d permit of the upon the shaft of guide rolls 10

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Figures 4, 5, of the double a in suitable bear 50 cutters are secu knives is tange The two holders are to be cut up face-plate where 55 In order to pern the serrated pla the racks p' and

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holder or frame *d* in which the block of wood *e* which is to be worked up is placed has an inclined position as shown in Figure 3. The wooden block *e* is pressed against the knife drum *b* by means of a serrated plate or piston *f* and is gradually pressed forward in the holder. In order to enable it to be moved, two racks *g* are attached to the serrated plate or piston and in these racks engage pinions attached to the common shaft *h*. The same shaft carries a worm-wheel *i* in which works a worm *k* causing it to revolve. The worm *k* is actuated by the belt *l* which runs on the drum-shaft *a*. Bevel gearing *m*, *n* and cone pulleys *o*, *p* are introduced to permit of the amount of the forward movement being regulated. The pinions upon the shaft *h* are caused to engage with the rack *g* with certainty by means of guide rolls *q* mounted on a shaft *r*.

The working and keeping in condition of a machine with inclined frame or holder is even when the turn out is a very large one, not attended by more difficulty than is the case with the machine formerly employed with straight holders.

The present system with inclined holder may be employed for many machines with flat pulley knife heads. In such case the same fine tanlike shavings may be obtained exactly as with the drum forming the subject of the present invention by imparting a cutting position to the knives and inclining the block.

If it be desired to keep the size of the flat pulley (or disc) so as to prevent the manipulations required in changing the knives from becoming too complicated and also to avoid taking up too much space it becomes necessary when the block is much inclined to give it only very small dimensions since the cutting edge of the knives is only imperfectly made use of and the turn out of the machine is consequently very small.

If an attempt be made to maintain the block in a straight position and to allow the knives to act in such an inclined position as to make the proper angle with the grain, it will be found that it is only possible to attain the proper angle in one single position, since it alters after the entry of the knife, when it has a position parallel to the grain, to a position at right angles to the grain which is the position it has at the moment when the knife passes out, the result of which is to turn out a product of a very unequal appearance. By arranging the block and the knives or cutters in such a way that the latter are tangential to a small circle described about the axis of the cutter-disc, the grain of the block is brought to an angle corresponding to the direction of the cutters, a middle course may be found by means of which the knives may be arranged so as to cut, their cutting edges being advantageously employed, and yet an unexceptionable product obtained.

To increase the turn out of a one-block-holder face plate-machine (which in spite of the advantageous cutting effect attained by the above described invention, takes up a good deal of room) without appreciably increasing the amount of space required the following plan is adopted. In front of one side of the face plate which is otherwise free a second holder or frame is arranged, which is closed by a lid to prevent the block from jumping out. Thus the face-plate cuts the block on one side from above downwards, on the other side from below upwards, both blocks presenting their grain at the same angle to the cutters.

Figures 4, 5, 6, are respectively a side view, plan and end view partly in section of the double action face-plate cutting machine. The revolving shaft *a* working in suitable bearings carries the face plate *b* in which two rows of knives or cutters are secured in such a way as to work "cutting." The direction of the knives is tangential to a circle described about the centre of the face-plate *b*. The two holders or frames *d*¹ and *d*² in which the blocks of wood *e*¹ and *e*² which are to be cut up are inclined in opposite directions. The holder in the side of the face-plate where the knives have an ascending motion is provided with a cover. In order to permit of the wooden blocks being moved forwards inside the holders the serrated plates or pistons *f*¹ and *f*² are provided, which are furnished with the racks *g*¹ and *g*². Pinions mounted on the shafts *h*¹ and *h*² engage with the

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racks. Each of the shafts carries a worm-wheel i^1 or i^2 which are caused to revolve by the worms k^1 , k^2 . These same shafts which carry the worms are provided with toothed wheels n^1 , n^2 which are set in equable revolution by the toothed wheel m^1 which engages with them. This wheel m^1 is driven from pulley l of the main shaft a by means of the cone pulleys p and o and suitable transmission gearing.

The shafts r working in bearings and carrying pressure-rollers for keeping the racks in position, are arranged above the racks and these rollers also serve to ensure the pinions which effect the forward movement of the block engaging with the racks. The movement of the serrated plates or pistons f^1 and f^2 backwards to permit of the insertion of fresh blocks is effected by means of the hand levers t^1 and t^2 .

Instead of the direction of the knives being tangential as shewn in Figures 4, 5 and 6, it may be radial.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In a machine for cutting wood into shavings on the drum system, the employment of a holder or frame (for the blocks) inclined to the axis of the cutter drum, substantially as hereinbefore described.
2. A machine for cutting wood into shavings having a frame or holder inclined to the axis of the cutter drum, and inclined straight cutting knives arranged on a drum of hyperboloid shape substantially as hereinbefore described.
3. A machine for cutting wood into shavings having a frame or holder inclined to the axis of the cutter drum, and a serrated plate or piston for pressing the wooden block forward the said plate being operated by racks driven by a worm from the drum shaft substantially as hereinbefore described.
4. The employment of an inclined frame or holder in a machine with face plate shaped knife head in which the knives are arranged for cutting (as opposed to scraping) either radial or tangential to a circle described around the axis of the disc as a centre substantially as hereinbefore described.
5. In a machine with face plate shaped knife head the employment of inclined frames or holders the one on the ascending side of the disc being provided with a lid or cover, substantially as hereinbefore described.
6. In a machine with face plate shaped knife head and two inclined frames or holders, the moving or pressing forward of the wooden blocks in both holders by means of two serrated plates or pistons which are each equally actuated by means of a worm and a rack and pinion from the pulley mounted on the pulley shaft, substantially as hereinbefore described.
7. The manufacture and use of the improved machines for cutting wood into shavings hereinbefore described and illustrated in the accompanying drawings.

Dated the 22nd day of July 1891.

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